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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,520	07/19/2006	Je-Kang Yoo	4971-0114PUS1	4604
2252	7590	01/09/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747		
		EXAMINER NGUYEN, VU ANH		
		ART UNIT	PAPER NUMBER	1796
NOTIFICATION DATE	DELIVERY MODE			
01/09/2009	ELECTRONIC			

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,520	<b>Applicant(s)</b> YOO ET AL.
	<b>Examiner</b> Vu Nguyen	<b>Art Unit</b> 1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-10 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08) \_\_\_\_\_  
 Paper No(s)/Mail Date 07/19/2006
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Objections***

1. Claim 1 is objected to because of the following informalities: In line 4, "an polyamide" should be changed to "a polyamide". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what totality the recited percents are based on.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 7 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Mickols (5,755,964).
6. Corresponding to the limitations set forth in these claims, Mickols teaches a method of treating polyamide membranes to increase flux, said method comprising (1)

preparing a polyamide layer on a porous substrate (col. 4, lines 52-62) according to the method taught in U.S. Pat. No. 4,277,344 to Cadotte (col. 3-4, bridging paragraph) and (2) treating the resulting reverse osmosis composite membrane with an amine that includes, among others, triethanolamine, which is a polyfunctional tertiary alcohol amine (col. 2, lines 58-67; col. 3, lines 1-20). The amine employed in the post-treatment step may be neat or in solution or even in gas phase (col. 5, lines 34-35). When it is in solution, the solvent preferably includes water (col. 5, lines 42 & 45) and its concentration is 5-100% by weight (col. 5, lines 54-64). The method taught by Cadotte is the same as the method recited in step (a) of claim 1 and includes the monomers recited in claims 2 and 3. In fact, Mickols employs mainly the reverse osmosis membranes commercially available (such as from Dow) under the trade name FT-30 (see Examples), which is based on a polyamide prepared by reacting 1,3-phenylenediamine and trimesoyl chloride. The so-treated polyamide thin film composite reverse osmosis membranes are obtained and tested (see Examples).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
9. Claims 4-6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mickols (5,755,964).
10. Regarding the limitations set forth in these claims, the preparation method of claim 1 has been shown to be anticipated by Mickols as discussed above. The post-treated membranes are dried at 60-80°C (Claim 7). Although a drying time is not disclosed, it is reasonable to expect it to be within the claimed range since it is taught that the length of time for contacting the polyamide layer with the amine is at least 30 minutes if done at ambient temperature (col. 5, lines 64-67) but can be shortened by doing the post treatment in ovens or dryers at 60-130°C (col. 6, lines 14-30). In some examples, the contacting time is 20-60 minutes at 60°C (Table 2).
11. Clearly, the essential difference between Mickols and the claimed invention is that Mickols fails to teach the amines recited in claims 4-6.
12. Regarding the claimed amines, these are essentially dimers and trimers of the disclosed compounds. For example, N,N,N',N'-tetrakis(2-hydroxyethyl)ethylenediamine can be viewed as a combination of triethanolamine and ethylenediamine, both of which are taught by Mickols.

13. Mickols teaches the followings. Optimum performance (i.e., high rejection rate for NaCl and high flux) of a reverse osmosis membrane can be obtained by controlling the following parameters in the post-treatment step: varying the amine, the concentration, the time of contact, the temperature of contact, the pH, and combinations thereof (col. 5, lines 5-13). Regarding the nature of the amines, the observed trend is that "**the more functional groups which are present on the amine, e.g., alcohol and/or amino groups, the greater the increase in flux.**" (col. 5, lines 50-53).

14. In light of such teachings, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified the method taught by Mickols by replacing the disclosed amines with their dimers and trimers or with amines that have a plurality of hydroxyl and amino functional groups per molecule so as to obtain RO membranes with maximum flux.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/  
Supervisory Patent Examiner, Art Unit 1796

Vu Nguyen  
Examiner  
Art Unit 1796